Common Course Outline
Math 163
College Algebra
3 Semester Hours

The Community College of Baltimore County

Description

Math 163 – 3 Credits
College Algebra
Explores the nature and scope of college mathematics through the study of functions. Topics include the study of polynomial, rational, radical, piece-wise defined, and absolute value functions and their graphs and applications as well as modeling with these functions. Additional topics include complex numbers, the binomial theorem, inverse functions, operations with functions, exponential and logarithmic functions and their graphs and applications.
Prerequisites: (Rdng 052 or LVR2) and (Engl 052 or LVE 2) or (ESOL 052 or LVE 2) and Algebra I and II in high school and a satisfactory score on the placement exam; or (Math 083 or LVM 3) Corequisites: (ENGL 052 or LVE 2) or (ESOL 052 or LVE 2)

Overall Course Objectives

Upon successfully completing the course students will be able to:

1. Produce and compare graphs of absolute value and piecewise-defined functions; (I, 2, 3, 4, 5)
2. Solve inequalities in one and two variables; (I, IV, 1, 3, 4, 5, 7)
3. Solve absolute value inequalities in one variable; (I, IV, 1, 3, 4, 5, 7)
4. Identify domain and range of functions; (I, IV, 1, 2, 3, 4)
5. Produce and compare graphs of functions, using translations, symmetry, end behavior, and asymptotes; (I, 2, 3, 4, 5)
6. Combine two or more functions using addition, subtraction, multiplication, division, or functional composition; (I, IV, 3, 4)
7. Identify the inverse of a given function; (I, IV, 3, 4, 7)
8. Identify the function, given information about the function; (I, III, IV, 1, 2, 3, 4, 5, 6, 7)
9. Model numerical data using quadratic functions to further analyze data and predict values; (I, III, IV, VI, 1, 2, 4, 6, 7)
10. Perform operations with functions; (I, IV, 3, 4)
11. Produce and compare graphs of exponential and logarithmic functions; (I, 2, 3, 4, 5)
12. Solve problems using exponential and logarithmic functions; (I, III, IV, VI, 1, 2, 4, 6, 7)
13. Produce and compare graphs of polynomial functions; (I, 2, 3, 4, 5)
14. Identify the zeros of polynomial functions; apply the Fundamental Theorem of Algebra; (I, IV, 1, 3, 4, 5, 7)
15. Identify the equation of a polynomial using the Theory of Equations and given sufficient information about its zeroes; (I, II, III, IV, 1, 2, 3, 4, 5)
16. Apply the Binomial Theorem to determine the coefficients of a polynomial; (I, III, IV, 1, 2, 3, 4, 5)
17. Solve rational equations; (I, IV, 1, 3, 4, 5, 7)
18. Produce graphs of rational functions; (I, IV, 1, 2, 3, 4, 5, 7)
19. Construct a solution to real world problems using problem methods individually and in groups; (II, IV, 2, 4, 5)

20. Examine the mathematical contributions made by people from diverse cultures throughout history. (V, 5)
21. Articulate a solution to mathematical problems; (II, 2)
22. Apply appropriate technology to the solution of mathematical problems. (IV, 4, 5)

Major Topics

I. Absolute value equations and inequalities
   a. Absolute value equations
   b. Absolute value inequalities

II. Functions
   c. Review domain, range, functional notation
   d. Modeling data with linear regression function
   e. Review quadratic functions and their graphs
   f. Graphing techniques using shifting/stretching techniques
   g. Absolute value and piecewise defined functions and their graphs

III. Polynomial Functions
   h. Graphs of polynomial functions
   i. Zeros of polynomial functions
   j. Complex numbers and theory of equations
   k. Fundamental Theorem of Algebra
   l. Modeling with polynomial functions

IV. Binomial Theorem
   m. Expanding a binomial
   n. Finding a term in a binomial expansion

V. Rational Functions and Radical Functions
   o. Graphs of rational functions
   p. Graphs of radical functions
   q. Equations and inequalities of rational and radical functions

VI. Combinations of Functions
   r. Arithmetic operations on functions
   s. Composition of functions
   t. One-to-one functions
   u. Inverse functions

VII. Exponential and Logarithmic Functions
   v. Definition and graphs of exponential functions
   w. Definition and graphs of logarithmic functions
   x. Properties of logarithms
   y. Solving exponential and logarithmic equations
   z. Applications of exponential and logarithmic functions

Course Requirements (General Education Goal #VII)

Students will be given opportunity to collaborate via group work and/or oral presentation of problem solutions. There will be multiple opportunities for the instructor to assess student progress in the course through classwork and/or homework.

Grading: Grading procedures will be determined by the individual faculty member but will include the following:

Tests (minimum of two): Individual faculty will notify students of the testing procedures to be used.

Other components, such as Projects or Group Work, may be part of the grade.

Comprehensive Final Exam: The course will include a comprehensive final exam.

Final Grades: Grades will be determined by individual faculty members.

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